

IN THE CLAIMS:

1. (currently amended) A method for retrospective internal gating, said method comprising:

scanning a patient to obtain projection data;

generating images from the projection data;

obtaining a signal representing information regarding a physiological cycle of motion of an object within the patient;

associating a plurality of sample points of the physiological cycle with each of the generated images, each plurality of sample points associated with phases of the physiological cycle;

calculating a phase of each of the generated images based on an average of the phases of a respective plurality of sample points associated with each of the generated images;

specifying at least one target phase in the physiological cycle of motion by calculating an average delta phase that is an average of phase differences between consecutive images of the generated images; and

sorting the generated images based on the at least one target phase ~~within the physiological cycle of motion of the object~~ to generate at least one set of images.

2. (previously presented) A method in accordance with Claim 1 further comprising receiving, from a user, a selection of a series of images from the at least one set of images, the selected series of images displaying a least amount of tissue motion compared to tissue motion of any other series in the at least one set of images.

3. (previously presented) A method in accordance with Claim 1 wherein sorting the generated images based on the at least one target phase comprises:

grouping images having the same spatial location to generate at least one group, wherein each group includes images with a z-location different than a z-location of images within any other group; and

selecting one image in each group for inclusion within the at least one set of images.

4. (previously presented) A method in accordance with Claim 3 wherein selecting one image in each group comprises selecting one image in each group, the image having a phase that lies within the at least one target phase and a phase tolerance.

5. (previously presented) A method in accordance with Claim 3 wherein selecting one image in each group comprises selecting one image in each group, the image having a phase that lies within the at least one target phase and a phase tolerance, and is near a middle of an acquisition period of a scan of the patient.

6. (previously presented) A method in accordance with Claim 1 further comprising:

validating the motion of the object by checking at least one of:

whether each cycle of a plurality of cycles of motion of the object is within a percentage of an average cycle of the plurality of cycles of motion of the object; and

whether an amplitude of each cycle of the plurality of cycles of motion of the object is within a percentage of an average amplitude of the plurality of cycles of motion of the object.

7. (original) A method in accordance with Claim 1 further comprising calculating phases of the images.

8. (previously presented) A method in accordance with Claim 7 wherein calculating phases of the images comprises:

determining a start scan time, a mid scan time, and an end scan time for each of the generated images;

determining a mid scan sample point for each of the generated images;

determining, for each of the generated images, additional sample points symmetrically located around the mid scan sample point; and

computing a phase of each of the generated images by performing one of:

averaging phases of the mid scan sample point and of at least one of the additional sample points; and

averaging phases of at least one of the additional sample points.

9-10. (canceled)

11. (currently amended) A system for imaging a moving object within a patient, the system comprising:

a scanner configured to acquire projection data of the patient;

an image reconstructor configured to generate images corresponding to the projection data; and

a controller configured to:

receive a signal representing information regarding a cycle of motion of the object;

receive generated images from said image reconstructor;

associate a plurality of sample points of the cycle of motion with each of the generated images, each plurality of sample points associated with phases of the cycle of motion;

calculate a phase of each of the generated images based on an average of the phases of a respective plurality of sample points associated with each of the generated images;

enable a user to specify at least one target phase within the cycle of motion by calculating an average delta phase that is an average of phase differences between consecutive images of the generated images; and

sort the generated images based on the at least one target phase ~~within the cycle of motion of the object~~ to generate at least one set of images.

12. – 16. (canceled)

17. (original) A system in accordance with Claim 11 wherein the controller is further configured to calculate phases of the images.

18. (currently amended) A system in accordance with Claim 17 wherein to calculate phases of the images the controller is configured to:

determine a start scan time, a mid scan time, and an end scan time for each of the generated images;

determine a mid scan sample point for each of the generated images;

determine, for each of the generated images, additional sample points symmetrically located around the mid scan sample point; and

compute a phase of each of the generated images by performing one of:

averaging phases of the mid scan sample point and of at least one of the additional sample points; and

averaging phases of at least one of the additional sample points.

19-20. (canceled)

21. (currently amended) A system for imaging a moving object within a patient, the system comprising:

a computed tomography (CT) scanner configured to acquire projection data of the patient;

an image reconstructor coupled to the CT scanner and configured to generate images corresponding to the projection data; and

a controller coupled to the image reconstructor and configured to:

receive a signal representing information regarding a cycle of motion of the object;

receive generated images from said image reconstructor;

associate a plurality of sample points of the cycle of motion with each of the generated images, each plurality of sample points associated with phases of the cycle of motion;

calculate a phase of each of the generated images based on an average of the phases of a respective plurality of sample points associated with each of the generated images;

enable a user to specify at least one target phase within the cycle of motion by calculating an average delta phase that is an average of phase differences between consecutive images of the generated images; and

sort the generated images based on the at least one target phase ~~within the cycle of motion of the object~~ to generate at least one set of images.

22. (currently amended) A computer configured to:

instruct a scanner to acquire projection data of the patient;

instruct an image reconstructor to generate images corresponding to the projection data;

receive a signal representing information regarding a cycle of motion of the object;

receive generated images from the image reconstructor;

associate a plurality of sample points of the cycle of motion with each of the generated images, each plurality of sample points associated with phases of the cycle of motion;

calculate a phase of each of the generated images based on an average of the phases of a respective plurality of sample points associated with each of the generated images;

enable a user to specify at least one target phase within the cycle of motion by calculating an average delta phase that is an average of phase differences between consecutive images of the generated images; and

sort the generated images based on the at least one target phase ~~within the cycle of motion of the object~~ to generate at least one set of images.

23. (previously presented) A computer in accordance with Claim 22 wherein the computer is further configured to receive, from a user, a selection of a series of images from the at least one set of images, the selected series of images displaying a least amount of tissue motion compared to tissue motion of any other series in the at least one set of images.

24. (currently amended) A computer-readable medium encoded with a program configured to:

instruct a scanner to acquire projection data of the patient;

instruct an image reconstructor to generate images corresponding to the projection data;

receive a signal representing information regarding a cycle of motion of the object;

receive generated images from the image reconstructor;

associate a plurality of sample points of the cycle of motion with each of the generated images, each plurality of sample points associated with phases of the cycle of motion;

calculate a phase of each of the generated images based on an average of the phases of a respective plurality of sample points associated with each of the generated images;

enable a user to specify at least one target phase within the cycle of motion by calculating an average delta phase that is an average of phase differences between consecutive images of the generated images; and

sort the generated images based on the at least one target phase ~~within the cycle of motion of the object~~ to generate at least one set of images.

25. (previously presented) A computer-readable medium in accordance with Claim 24 wherein the program is further configured to receive, from a user, a selection of a series of images from the at least one set of images, the selected series of images displaying a

least amount of tissue motion compared to tissue motion of any other series in the at least one set of images.

26-27. (canceled)

28. (new) A system in accordance with Claim 17 wherein to calculate phases of the images the controller is configured to specify a phase of a first image of the generated images as a first target phase.

29. (new) A system in accordance with Claim 28 wherein the controller is further configured to determine a subsequent target phase by adding the average delta phase to the first target phase.

30. (new) A system in accordance with Claim 17 wherein to calculate phases of the images the controller is configured to determine a number of phases by dividing 2π by the average delta phase.

31. (new) A system in accordance with Claim 18 wherein the controller is further configured to determine a confidence level of each of the sample points by correlating image data acquisition times to acquisition times of each of the sample points.

32. (new) A system in accordance with Claim 18 wherein to determine additional sample points the controller is configured to determine if each of the additional sample points satisfies at least one of:

an X-Ray source of the scanner is turned on at a time corresponding to a respiratory sample point;

a confidence level for a respiratory sample point is non-negative;

a number of valid respiratory sample points used to calculate the phases of the images is defined via an environmental variable that is one of a minimum number of valid respiratory sample points and a maximum number of valid respiratory sample points;

the respiratory sample points of the cycle of motion are searched symmetrically from the mid scan sample point outward; and

a search for the valid respiratory sample points is limited to a total number of respiratory sample points falling within an acquisition period.